## AMMENDMENTS TO THE CLAIMS

1. Pursuant to 37 C.F.R. § 1.121(c), this separate paper is submitted showing the claim listing of all claims ever presented in the instant case.

1. (Original) A composite resistance spot welding electrode comprising:

(a) a shank portion;

(b) a transition portion integral with the shank portion, the transition portion comprising:

(i) an annular groove co-axial with the transition portion; and

(ii) a co-axial neck ring contained within the annular groove; and

(c) a tip portion integral with the transition portion, the tip portion comprising:

(i) a co-axial cavity having an opening to a tip portion end distal to the transition portion;

(ii) an insert contained within the cavity, the insert having an end co-terminus with the distal tip portion end; and

(iii) a co-axial annular outer sleeve, the sleeve having an end co-terminus with the distal tip portion end, the tip portion end, the insert, and the sleeve end cooperating to form a flat face; wherein

(d) the insert comprises no more than about 40 percent of the area of the face; and

(e) the sleeve has a thickness in the radial direction of about 10-20 percent of the radius of the face.

2. (Original) The electrode of claim 1, wherein the ring, the insert, and the sleeve are formed from stainless steel.

3. (Original) The electrode of claim 2, wherein the stainless steel is 304 stainless steel.

4. (Original) The electrode of claim 3, wherein the insert comprises about 16 percent of the area of the face.

5. (Original) The electrode of claim 3, wherein the sleeve has a thickness in the radial direction of about 15 percent of the radius of the face.

6. (Original) A first and a second electrode, each electrode according to claim 1, wherein when:

(a) the first and second electrodes are placed in a facing, spaced-apart relationship;

(b) a workpiece comprising two sheets of 2 mm-thick 5XXX aluminum are placed therebetween;

(c) the first and second electrodes compress the workpiece with a force of about 700-2000 pounds-force; and

(d) a 60-Hz current of about 20-30 KA is passed through the workpiece for 8-12 cycles;

(e) a nugget is formed with a thickness of between 0.8-3.4 mm and a diameter of between 2-6 mm.

7. (Original) The electrodes of claim 6, wherein:

(a) the compressive force is about 1550 pounds-force;

(b) the current is about 22 KA; and

(c) the nugget thickness is about 2.7-3.4 mm.

8. (Original) A composite resistance spot welding electrode comprising:

(a) a shank portion;

(b) a tip portion integral with the shank portion, the tip portion comprising a co-axial annular outer sleeve, the sleeve having an end co-terminus with a tip portion end distal to the shank portion, the tip portion end and the sleeve end cooperating to form a smooth, continuous tip face; wherein

(c) the sleeve has a thickness in the radial direction of about 10-30 percent of the outside radius of the sleeve.

9. (Currently Amended) The electrode of claim 8, wherein the sleeve is formed from a material selected from the group consisting of ~~stainless~~ steel and tungsten.

10. (Currently Amended) The electrode of claim 9, wherein the ~~stainless~~ steel is ~~304~~ stainless steel.

11. (Original) The electrode of claim 10, wherein the sleeve has a thickness in the radial direction of about 15 percent of the outside radius of the face.

12. (Original) A first and a second electrode, each electrode according to claim 8, wherein when:

(a) the first and second electrodes are placed in a facing, spaced-apart relationship;

(b) a workpiece comprising two sheets of 2 mm-thick 5XXX aluminum are placed therebetween;

(c) the first and second electrodes compress the workpiece with a force of about 700-2000 pounds-force; and

(d) a 60-Hz current of about 20-30 KA is passed through the workpiece for 10 cycles;

(e) a nugget is formed with a thickness of between 0.8-3.4 mm and a diameter of between 2-6 mm.

13. (Original) The electrodes of claim 12, wherein:

(a) the compressive force is about 1550 pounds-force;

(b) the current is about 22 KA; and

(c) the nugget thickness is about 2.7-3.4 mm.

14. (Original) A composite resistance spot welding electrode comprising:

(a) a shank portion

(b) a tip portion integral with the shank portion, the tip portion comprising:

(i) a co-axial cavity having an opening to a tip portion end distal to the shank portion; and

(ii) an insert contained within the cavity, the insert having an end co-terminus with the distal tip portion end, the tip portion end and the insert cooperating to form a smooth, continuous tip face; wherein

(c) the diameter of the insert is no more than about 50 percent of the diameter of the tip.

15. (Currently Amended) The electrode of claim 14, wherein the insert is formed from a material selected from the group consisting of ~~stainless~~ steel and tungsten.

16. (Currently Amended) The electrode of claim 15, wherein the ~~stainless~~ steel is ~~304~~ stainless steel.

17. (Original) A first and a second electrode, each electrode according to claim 14, wherein when:

(a) the first and second electrodes are placed in a facing, spaced-apart relationship;

(b) a workpiece comprising two sheets of 2 mm-thick 5XXX aluminum are placed therebetween;

(c) the first and second electrodes compress the workpiece with a force of about 700-2000 pounds-force; and

(d) a 60-Hz current of about 20-30 KA is passed through the workpiece for 10 cycles;

(e) a nugget is formed with a thickness of between 0.8-3.4 mm and a diameter of between 2-6 mm.

18. (Original) The electrodes of claim 17, wherein:

(a) the compressive force is about 1550 pounds-force;

(b) the current is about 22 KA; and

(c) the nugget thickness is about 2.7-3.4 mm.

19. (Original) The electrode of claim 14, the tip portion further comprising:

(a) a co-axial annular outer sleeve, the sleeve having an end co-terminus with the distal tip portion end, the tip portion, the insert, and the sleeve end cooperating to form a smooth, continuous tip face; wherein

(b) the annular sleeve has a thickness in the radial direction of about 5-15 percent of the outside diameter of the sleeve.

20. (Currently Amended) The electrode of claim 19, wherein the insert and the sleeve are formed from a material selected from the group consisting of ~~stainless~~ steel and tungsten.

21. (Currently Amended) The electrode of claim 20, wherein the ~~stainless~~ steel is ~~304~~ stainless steel.

22. (Original) A first and a second electrode, each electrode according to claim 19, wherein when:

(a) the first and second electrodes are placed in a facing, spaced-apart relationship;

(b) a workpiece comprising two sheets of 2 mm-thick 5XXX aluminum are placed therebetween;

(c) the first and second electrodes compress the workpiece with a force of about 700-2000 pounds-force; and

(d) a 60-Hz current of about 20-30 KA is passed through the workpiece for 10 cycles;

(e) a nugget is formed with a thickness of between 0.8-3.4 mm and a diameter of between 2-6 mm.

23. (Original) The electrodes of claim 22, wherein:

(a) the compressive force is about 1550 pounds-force;

(b) the current is about 22 KA; and

(c) the nugget thickness is about 2.7-3.4 mm.

24. (Currently Amended) A method of resistance spot welding comprising:

(a) providing a first and a second electrode, each electrode according to claim 1;

(b) placing the first and second electrodes in a facing, spaced-apart relationship;

(c) placing a workpiece comprising two sheets of metal therebetween; and

(d) urging the first and second electrodes together to compress the workpiece; ~~and~~ whereby:

[[(e)]] ~~passing a 60 Hz current of about 20-30 KA through the workpiece; whereby~~

[[(f)]] (i) a nugget is formed.

25. (New) A composite resistance spot welding electrode comprising:

(a) a shank portion;

(b) a transition portion integral with the shank portion, the transition portion comprising:

(i) an annular groove co-axial with the transition portion; and

(ii) a co-axial neck ring contained within the annular groove;

(c) a tip portion integral with the transition portion, the tip portion having a tip face distal to the transition portion; and

(d) a coolant channel, the coolant channel having a closed end proximate to the tip face; wherein

(e) the neck ring has a thickness in the axial direction of between 10-40 percent of the distance from the tip face to the bottom of the coolant channel.

26. (New) A composite resistance spot welding electrode comprising:

(a) a shank portion;

(b) a transition portion integral with the shank portion, the transition portion comprising:

(i) an annular groove co-axial with the transition portion; and

(ii) a co-axial neck ring contained within the annular groove; and

(c) a tip portion integral with the transition portion, the tip portion comprising:

(i) a co-axial cavity having an opening to a tip portion end distal to the transition portion;

(ii) an insert contained within the cavity, the insert having an end co-terminus with the distal tip portion end; wherein

(d) the diameter of the insert is no more than about 50 percent of the diameter of the tip.

27. (New) A composite resistance spot welding electrode comprising:

(a) a shank portion;

(b) a transition portion integral with the shank portion, the transition portion comprising:

(i) an annular groove co-axial with the transition portion; and

(ii) a co-axial neck ring contained within the annular groove; and

(c) a tip portion integral with the transition portion, the tip portion comprising:

(i) a co-axial annular sleeve, the sleeve having an end co-terminus with the distal tip portion end; wherein

(d) the annular sleeve has a thickness in the radial direction of about 5-15 percent of the outside diameter of the sleeve.

28. (New) In a composite resistance spot welding electrode for welding a workpiece, a weld tip for applying pressure to a workpiece to be welded, the weld tip comprising:

(a) a conductive inner portion having an end surface for contacting the workpiece; and

(b) a high-strength, low-conductivity outer sleeve, the sleeve having an end surface which cooperates with the inner portion end surface to form a continuous face therewith.

29. (New) The weld tip of claim 28, wherein the sleeve is formed from a material selected from the group consisting of steel and tungsten.

30. (New) A method of resistance spot welding comprising:

(a) providing a first and second electrode, each electrode comprising a tip according to claim 28;

(b) placing the first and second electrodes in a facing, spaced-apart relationship;

(c) placing a workpiece comprising two sheets of metal therebetween;

(d) urging the first and second electrodes together to compress the workpiece; and

(e) passing an electric current through the workpiece; whereby

(f) a nugget is formed.

31. (New) The weld tip of claim 28, wherein during a weld operation on the workpiece:

(a) a contact pressure maximum occurs at an interface between the workpiece and the sleeve end surface.

32. (New) A method of resistance spot welding a workpiece comprising the steps of:

(a) applying pressure against the workpiece with a first and a second electrode in a facing, spaced-apart relationship, each electrode comprising a tip according to claim 28; and

(b) passing an electric current through the workpiece; whereby:

(i) a contact pressure maximum occurs between the workpiece and each electrode face at the sleeve end surface.

33. (New) The weld tip of claim 28, wherein:

(a) an electric current flowing through the weld tip is directed toward the center of the planar face.

34. (New) A method of resistance spot welding a workpiece comprising the steps of:

(a) providing a first and second electrode, each electrode comprising a tip according to claim 33;

(b) placing the workpiece comprising two sheets of metal therebetween;

(c) urging the first and second electrodes together to compress the workpiece; and

(d) passing an electric current through the first and second electrodes; whereby

(i) the electric current flowing through the first and second electrodes is directed toward the center of the first and second planar face, respectively.